

Applicant : Gene Parunak, et al.  
Serial No. : 10/014,520  
Filed : December 14, 2001  
Page : 11 of 18

Attorney Docket No.: 19662-026001

### REMARKS

Applicants have considered the office action mailed September 22, 2006 in connection with the above-identified patent application.

Applicants point out to the Examiner that Applicants filed an information disclosure statement and list of references cited by Applicant on October 16, 2006, and request his consideration thereof at such time as he next acts on the instant application.

Applicants also reiterate their request, expressed in the Amendment and Responses filed November 10, 2005 and on June 26, 2006, and again ask that the Office records be updated with the current attorney docket number (19662-026001) for the subject application.

### Statement of Substance of Interview

Applicants' representative, the undersigned, thanks Examiner Sines for courtesies extended during a telephonic interview on January 9, 2007. During that interview, Applicants presented reasons for the patentability of the then-pending claims. Applicants' representative pointed out differences between the claimed technology and that disclosed in the cited references. Although no formal agreement was reached at the time of the interview, the Examiner invited Applicants to submit a written summary of their arguments.

### Amendments to the Drawings

With the instant amendment and response, Applicants amend the drawings to correct various clerical errors, the nature of which would be clear to one of ordinary skill in the art and which are, as follows.

FIG. 6 is amended to delete a second instance of reference numeral 400. Applicants respectfully point out that, as would be clear from the accompanying portion of the specification (see, e.g., page 9, line 27 – page 10, line 2 of the instant application (¶[0056] of Patent Application Publication No. 2002/0141903)) the reference numeral 400 refers to a space, as shown in both FIGs. 6 and 7. The instance of numeral 400 that points to a lower surface of member 900 is thus clearly in error and is deleted herewith.

Applicant : Gene Parunak, et al.  
Serial No. : 10/014,520  
Filed : December 14, 2001  
Page : 12 of 18

Attorney Docket No.: 19662-026001

FIG. 7 has been amended to correct the reference numerals 936 and 913, to 136 and 931 respectively. The correction of such reference numerals is consistent with other drawings including, for example, FIG. 6, and the accompanying description found in the specification as filed (see, e.g., page 9, line 27 – page 10, line 8 of the instant application (¶ [0056] and [0057] of Patent Application Publication No. 2002/0141903).

All of the amendments to the figures are therefore merely for consistency with other figures and with the specification as filed, no new matter is introduced thereby, and entry thereof is respectfully requested.

#### Amendments to the Claims

Claims 1, 3, 6-9, 11, 12, 14-16, 18-21, 23-26, 30-33, and 38-56 are pending in the instant Application.

With the instant amendment, Applicants amend claims 14 and 16 to correct their respective dependencies. Accordingly, such amendments introduce no new matter and entry thereof is respectfully requested.

#### REJECTIONS OF THE CLAIMS

The Examiner has rejected claims 1, 3, 6-9, 11, 12, 14-16, 18-21, 23-26, 30-33, and 38-56, under 35 U.S.C. § 103(a) as allegedly being obvious over U.S. Patent Application Publication No. 2002/0055167 to Pourahmadi, ("Pourahmadi", hereinafter), in view of U.S. Patent No. 6,130,098 to Handique ("Handique" hereinafter). Applicants respectfully traverse the rejection.

The U.S. Patent and Trademark Office ("PTO") bears the burden of establishing a *prima facie* case of obviousness. *In re Bell*, 26 USPQ2d 1529 (Fed. Cir. 1993). To establish a *prima facie* case, the PTO must satisfy three basic criteria, one of which is that the prior art reference, or references when combined, must teach or suggest each and every limitation of the claimed invention. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Applicant : Gene Parunak, et al.  
Serial No. : 10/014,520  
Filed : December 14, 2001  
Page : 13 of 18

Attorney Docket No.: 19662-026001

Applicants respectfully submit that the Examiner has not satisfied the Office's burden of establishing a *prima facie* case, at least because the combination of cited references fails to teach or disclose every element of Applicants' claimed invention.

To summarize the basis of the Examiner's rejection, Pourahmadi teaches various elements of a microfluidic device, including — allegedly — "one or more filters ... for capturing sample components". Although, according to the Examiner, "Pourahmadi does not specifically teach the further incorporation of a gas actuator to facilitate sample fluid flow", because "Handique teaches a thermopneumatic apparatus comprising a gas actuator for facilitating fluid transport in microfluidic devices ... a person of ordinary skill in the art would accordingly have had a reasonable expectation for success in incorporating such a thermopneumatic fluid transport system with a microfluidic apparatus."

Although Applicants respectfully disagree that there would be either a motivation to combine Pourahmadi and Handique, or a reasonable expectation of success that the combination would function, at least for reasons expressed in their amendment and response dated June 26, 2006, which are incorporated herein by reference in their entirety, and further for reasons expressed hereinbelow, Applicants now take this opportunity to point out further distinctions between Pourahmadi and Handique and the instant claims, distinctions that transcend any considerations of motivation to combine or reasonable expectation of success in combining the references.

Claims 1 and 19, from which all other claims respectively depend, recite microfluidic devices. Specifically, claim 1 recites an "enrichment module comprising a flow-through member and an enrichment chamber, wherein the flow-through member is configured to allow fluid of the particle-containing fluid to pass through the flow-through member thereby accumulating an enriched particle sample, comprising particles of the particle-containing fluid, in the enrichment chamber." Thus, in the device of claim 1, the sample is enriched to give an enriched particle sample that remains in the enrichment chamber, from where excess fluid from the sample flows through the flow-through member. A further description of this can be found in the specification

Applicant : Gene Parunak, et al.  
Serial No. : 10/014,520  
Filed : December 14, 2001  
Page : 14 of 18

Attorney Docket No.: 19662-026001

as filed at, e.g., page 10, line 29 to page 11, line 12 ([0062-0063] of Patent Application Publication No. 2002/0141903), in conjunction with FIGs. 6 and 7.

Claim 19 recites a microfluidic device having an "enrichment module configured to separate an enriched particle sample from a microdroplet of particle-containing fluid" and "an actuator configured to move the enriched particle sample downstream from the enrichment module *with essentially no dilution of the enriched particle sample*" (emphasis added herein).

It can be seen that in each case, then, in Applicants' claims, the action of the enrichment module is to create an enriched (*i.e.*, more concentrated because fluid has been removed from it) sample that is then subjected to further downstream processes.

By contrast, Pourahmadi discloses a microfluidic cartridge that is configured to work in a markedly different way from Applicants' claimed invention. Applicants reproduce on the next page, for the Examiner's convenience, FIG. 2 of Pourahmadi, in which portions have been highlighted by Applicants to better illustrate the differences with the claimed invention.

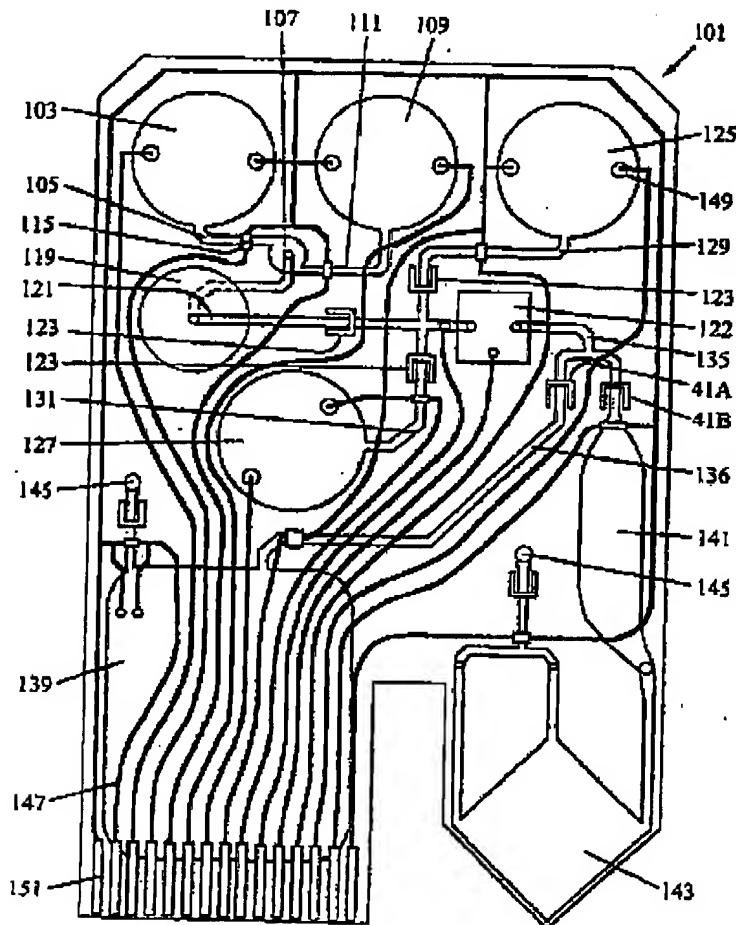
The various elements of Pourahmadi FIG. 2 are described at paragraphs [0048 – 0056] of Pourahmadi, and a description of relevant operation is found at paragraphs [0068 – 0072]. In operation, the cartridge of Pourahmadi first lyses a sample in a lysing chamber 119 (see Pourahmadi paragraphs [0068 – 0069]). In chamber 119, both sample and lysing reagents from storage chamber 109 are present together and, during lysing, debris are captured by a filter. The debris are removed from the sample. This is in contrast to the recitation of Applicants' claims, wherein an enrichment module causes excess fluid to be removed from the sample, thereby enriching particulates in the sample.

Furthermore, an additional element of Pourahmadi, the "capture component 122" does not correspond to any element of Applicants' claims. In Pourahmadi, the lysed sample is directed down channel 121 to the capture component 122, from where excess lysing reagent and fluid are directed down channel 136 to waste chamber 139 (paragraph [0070]). Nucleic acid from the sample is retained by the capture component. Subsequently, the capture component is subjected to, first, a washing (paragraph [0071]) and, second, an elution (paragraph [0072]). In these respective steps, washing fluid from chamber 125 and elution fluid from chamber 127, are

Applicant : Gene Parunak, et al.  
 Serial No. : 10/014,520  
 Filed : December 14, 2001  
 Page : 15 of 18

Attorney Docket No.: 19662-026001

directed through the capture component 122. These actions in Pourahmadi are also in contrast to Applicants' invention for at least the following reasons: Applicants' claims recite enrichment of a particle-containing sample, and do not recite capture of nucleic acid on to a flow-through member. Applicants' claims also do not require either a washing or an elution to be applied to a sample, in the recited steps. By contrast, the enriched particle sample in Applicants' claims is impelled, subsequent to enrichment, by an actuator, and is not eluted.



**FIG. 2**  
**Pourahmadi, 2002//0055167**

Applicant : Gene Parunak, et al.  
Serial No. : 10/014,520  
Filed : December 14, 2001  
Page : 16 of 18

Attorney Docket No.: 19662-026001

In sum, Pourahmadi does not teach several elements of Applicants' claimed invention. The deficiencies of Pourahmadi are not provided by Handique, which does not describe a flow-through component, or methods for particle enrichment. Thus, the structures recited in the instant claims cannot be found in the cited references, either alone or in combination.

Accordingly, for at least these reasons, Applicants' recited claims 1 and 19 are not obvious over a combination of Pourahmadi and Handique because said combination does not provide each and every element of Applicants' claims.

Nevertheless, and although not necessary to address the rejections of record, Applicants take this opportunity to further rebut the Examiner's specific grounds for obviousness. In essence, the Examiner has alleged that one of ordinary skill in the art would have had a reasonable expectation that the actuator taught by Handique could be successfully combined with a microfluidic cartridge of Pourahmadi. Applicants respectfully submit that this rejection is rendered moot by the foregoing arguments, but also ask the Examiner to consider the following.

First (September 22, 2006 Office Action at page 3), the Examiner references the disclosure of a filter in Pourahmadi and alleges that "it would have been obvious to a person of ordinary skill in the art to incorporate an enrichment zone or chamber ... positioned upstream of the lysing chamber". However this interpretation of Pourahmadi overlooks, as described hereinabove, that the filter in Pourahmadi is *inside* a chamber where the sample is lysed. Since neither Pourahmadi nor Handique discloses an enrichment zone as recited by Applicants, and since neither reference teaches positioning any type of filter upstream of a lysing chamber, Applicants' respectfully submit that a finding of obviousness has not been made.

Second, (September 22, 2006 Office Action at pages 4-5), the Examiner alleges that one of ordinary skill in the art would have had a reasonable expectation of success in combining an actuator taught by Handique with the cartridge of Pourahmadi. Applicants again respectfully disagree because the actuator of Handique is configured to move a microdroplet, whereas Pourahmadi is configured to accept samples on a continuous-flow model. Without a specific teaching that the actuators of Handique can be configured to move continuous volumes of fluid,

Applicant : Gene Parunak, et al.  
Serial No. : 10/014,520  
Filed : December 14, 2001  
Page : 17 of 18

Attorney Docket No.: 19662-026001

one of ordinary skill in the art would simply not have expected to be able to use the actuators of Handique with Pourahmadi's device.

The Examiner has also alleged — in response to Applicant's arguments — that Pourahmadi's device is capable of processing microliter volumes of sample. A key difference, however, between Pourahmadi and Handique is that the device in Pourahmadi is configured to accept considerably larger volumes of sample (on a continuous flow basis) and, in the process, to concentrate them down to smaller volumes. By contrast, Handique processes microliter volumes that are input as such. It is for at least this reason, that one of ordinary skill in the art would not have thought to combine the teachings of Handique and Pourahmadi.

Finally, the Examiner has responded (September 22, 2006 Office Action at pages 11-13) to Applicants' previous arguments by suggesting that arguing the merits of the references individually is inapposite when rebutting an allegation of obviousness because it is the totality of the teachings that is relevant. Applicants do not disagree with this principle. However, where an allegation of obviousness is being rebutted because one or more of the references lacks a specific element recited in the claims, it is necessary to point this out on a reference by reference basis. Applicants did that, and further pointed out a basis for which the combination would not have rendered the claims obvious. Thus, Applicants believe their line of reasoning to be appropriate in the circumstances.

Dependent claims are nonobvious under 35 U.S.C. § 103 "if the independent claims from which they depend are nonobvious." *In re Fine* 837 F.2d 1071; 5 USPQ.2d 1596; MPEP 2143.03. Claims 3, 7, 8, 14 – 16, 18, and 38 – 51 depend directly or indirectly from claim 1, and claims 20, 21, 24 – 26, 28, 30 – 33, and 52 – 56 depend directly or indirectly from claim 19. Therefore, none of these claims is obvious over Pourahmadi in combination with Handique.

Accordingly and in conclusion, Applicants respectfully submit that all of the pending claims are non-obvious in view of a combination of Pourahmadi and Handique, and ask that the rejection of record be removed.

Applicant : Gene Parunak, et al.  
Serial No. : 10/014,520  
Filed : December 14, 2001  
Page : 18 of 18

Attorney Docket No.: 19662-026001

### CONCLUSION

In view of the above remarks, Applicants respectfully submit that the subject application is in good and proper order for allowance. Withdrawal of the Examiner's rejections and early notification to this effect are earnestly solicited. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is encouraged to call the undersigned at (650) 839-5070.

No fee is believed owed in connection with filing of this amendment and response, other than associate with the petition for extension of time separately authorized herewith. However, should the Commissioner determine otherwise, the Commissioner is authorized to charge any underpayment or credit any overpayment to Fish & Richardson P.C. Deposit Account No. 06-1050 (ref. No. 19662-026001) for the appropriate amount. A copy of this sheet is attached.

Respectfully submitted,

Date: January 22, 2001

Richard G. A. Bone  
Richard G. A. Bone  
Reg. No. 56,637

Fish & Richardson P.C.  
500 Arguello Street, Suite 500  
Redwood City, California 94063  
Telephone: (650) 839-5070  
Facsimile: (650) 839-5071

50376754.doc